

# **EXHIBIT A**

## **SCOPE OF WORK AND SCHEDULE 2020 Peninsula Gateway Corridor Study**

### **SCOPE OF WORK**

#### **TASK 1 - DETAILED WORK PROGRAM AND SCHEDULE**

The goal of this task is to gain acceptance of the Work Program, which consists of this Scope of Work and the Schedule Milestones below, by the Project Manager, the Technical Advisory Committee (TAC) and the Policy Advisory Committee (PAC). Contractor shall present the Work Program at a Kickoff Meeting with the TAC and, subsequently, the PAC. At each committee Kickoff Meeting, the Contractor will review the Work Program page by page, highlighting the details of each task, including deliverables, and seek feedback in the form of questions and comments. The Contractor will take notes at the TAC meeting and prepare a summary of comments for review by the Project Manager and the PAC at the subsequent Kickoff Meeting.

The Contractor will review all desired Work Program changes with the Project Manager, and discuss in detail how best to accomplish them within the Budget. The Contractor does not expect the overall budgeted level of effort to change as a result of the desired Work Program changes. The Contractor will then create a Refined Work Program.

#### **Deliverables**

- Notes from TAC and PAC meetings: one electronic file in Word for Windows format
- Refined Work Program: one electronic file in Word for Windows format.

#### **TASK 2 - PUBLIC INPUT**

Contractor shall prepare a brief memorandum that outlines the plan for obtaining public input in this task and informing the public as a part of the public outreach tasks (Tasks 10 and 12). Generally, the expectation is to accomplish these public communication tasks by holding two cycles of three open meetings, one cycle in this task and one in Task 10. To maximize potential attendance, meetings would be held in Palo Alto, East Palo Alto, and Menlo Park.

Contractor shall prepare a PowerPoint presentation to summarize the study objectives, issues, potential alternatives, and the Work Program, using materials previously prepared in the Contractor's Proposal and interview presentation. Contractor shall prepare a handout from the PowerPoint presentation.

Contractor shall attend three public meetings and participate in the presentations to inform attendees about the study and listen to their ideas about potential solutions. Contractor shall record public comments at the three meetings, and summarize them in a memorandum.

#### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the public input and outreach plan and one TAC meeting and one PAC meeting to review the rest of the deliverables and receive feedback.

## **Deliverables**

- Memorandum regarding public input and outreach plan: one electronic file in Word for Windows format
- PowerPoint presentation: one electronic file
- Handout from PowerPoint presentation: one camera-ready copy
- Memorandum summarizing public input process and comments received, including a list of ideas or options to carry forward into the analysis: one electronic file in Word for Windows format.

## **TASK 3 - DATA COLLECTION AND EXISTING CONDITIONS**

Contractor shall develop a procedure to assemble data and information and derive a summary of existing traffic conditions in the study area. This shall be reviewed by the Project Manager, edited, and then submitted for review by the TAC and PAC. The following points constitute a preliminary draft of this procedure.

### **Collect and Review All Recent and Pertinent Reports and Study Efforts Including But Not Limited To**

- San Francisco Bay Crossings Study (MTC)
- Dumbarton Rail Corridor Study (JPB)
- Caltrain Rapid Rail Program (JPB)
- Countywide Ramp Metering Study (C/CAG)
- Countywide ITS Strategic Plan Study (C/CAG)
- Charleston Corridor Study (Palo Alto)
- Commuter Traffic Mitigation Study (East Palo Alto)
- San Mateo County - Countywide Transportation Plan (C/CAG)
- San Mateo County - Congestion Management Program (C/CAG)
- San Mateo County - Congestion Management Program Monitoring Report (C/CAG)
- Santa Clara Valley Transportation Plan 2020 (VTA)
- Santa Clara County Congestion Management Program (VTA)
- Santa Clara County Congestion Management Program Monitoring Report (VTA)
- San Mateo County Transportation Authority Strategic Plan (SMCTA)
- 101 Ramp Metering Analysis and Plan - Embarcadero to De La Cruz (Caltrans)
- Bay Area Freeway Congestion Data 2002 (Caltrans)
- Project Study Report - Route 109 from Dumbarton Bridge to Destinations South of the Bridge (Caltrans)
- Traffic Impact Analysis Reports (partner agencies)
- C/CAG Travel Demand Model Trip Tables (Base Year) (C/CAG)

### **Collect and Review Traffic Data**

- Available state highway traffic data (daily and hourly summaries) - segments, ramps, trucks (Caltrans Traffic Census)
- Available state highway travel time and speed profile summaries (Caltrans Operations)
- Available local streets traffic data (intersection turning movements, street segments) (partner agencies)
- Conduct new intersection turning movement counts at 30 intersections (one day AM and PM peak hour)

- Conduct new machine traffic counts at 20 roadway locations (three days - Tuesday through Thursday)
- Conduct driving tours of study area

### **Summarize Existing Conditions**

A spreadsheet will be prepared to document traffic data by kind (intersection, segment, ramp, speeds, and truck), date, location, direction, time period, and source. The new traffic data will be supplemented with other available data to develop a composite map of traffic volumes in the study area and at primary local street intersections.

Existing roadway congestion in the study area will be defined from recent congestion management monitoring reports, the 101 Ramp Metering Analysis and Plan, the Bay Area Freeway Congestion Data Report, the Countywide Ramp Metering Study, and traffic impact analysis reports sponsored by partner agencies. An exhibit will be created to depict congestion by color coding; this information will be presented as an overlay on the composite traffic volumes map.

The trip tables from the travel demand model will be used to develop a graphical representation of origins and destinations of traffic on Route 101 and Route 84 in the study area. This will be focused on cross-bay traffic movements using the Dumbarton Bridge and connecting to Route 101, the intent being to define the predominant movements (i.e. westbound to northbound, westbound to southbound).

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the data collection and review procedure and one TAC meeting and one PAC meeting to review the rest of the deliverables and receive feedback.

### **Deliverables**

- Memorandum regarding data collection and review procedure: one electronic file in Word for Windows format
- Memorandum on existing conditions: one electronic file in Word for Windows format.

## **TASK 4 - CONCEPTUAL DEFINITION & ENGINEERING OF ALTERNATIVES**

### **Define Alternatives**

The Contractor shall identify and list a full range of alternatives. C/CAG staff and funding partner staff, together with the Technical and Policy Advisory Committees will work with the Contractor to select up to eight large and medium alternatives for a detailed and complete analysis. Attempts will be made to merge alternatives to include as much coverage as possible in the eight alternatives selected. The remaining alternatives not selected will receive a brief analysis that highlights the obvious issues related to that alternative. The definition step will focus on projects other than those already committed.

- Identify smaller and medium, relatively low-cost improvements will also be defined, including ramp metering, based on results of the ongoing C/CAG Ramp Metering Plan project, and ITS, based on results of the ongoing C/CAG ITS Strategic Plan project.

### **Assess Fatal Flaws**

An initial fatal flaw assessment will be conducted to screen each alternative for impacts or potential costs that would render it either cost prohibitive, otherwise unacceptable, or impossible to build. This will address potentially critical design exceptions, constructability, cost, phasing, and environmental, right-of-way, and utility constraints.

### **Develop Conceptual Sketches**

Conceptual line diagram sketches (in plan view) will be developed for each of the capacity-increasing alternatives using large-scale aerial photographs as backgrounds. Generally, a scale of 1:1,000 or 1:2,000 is suitable for these sketches, but more complex elements may require a scale of 1:500. Conceptual cross-sections will be developed to complement the plan sketches.

### **Meetings**

Contractor shall attend two TAC meetings and two PAC meetings to review the deliverables and receive feedback.

### **Deliverables**

- Memorandum summarizing the alternatives definition and engineering process, including summary descriptions and conceptual sketches and cross-sections: electronic file(s) in Word for Windows format
- Appendix of supportive materials: one camera-ready copy.

## **TASK 5 - TRAVEL FORECASTING**

### **Travel Forecasting Work Expected From C/CAG**

Due to the sizeable number of transportation studies currently being conducted within the Peninsula Gateway Corridor, the travel demand forecasting effort should be somewhat simplified and need not entail extensive model development or sub-area recalibration. In particular, two transportation planning studies, (1) the Route 101 Corridor from Whipple Avenue to Embarcadero Road and (2) the Dumbarton Rail Corridor Ridership Forecast Study, will yield a modeling tool that represents the study area in sufficient detail. As a result, traffic forecasts for the Peninsula Gateway study will involve only straight-forward network modifications and subsequent application of the models that evolve from these other studies. The resulting modeling tool also addresses an equally important matter of maintaining consistent results between the C/CAG Travel Demand Model and the VTA Regional Model; an aspect of particular focus concerning the Dumbarton Rail Corridor Ridership Forecast Study.

The initial effort in this task will involve the Contractor meeting with Hexagon (C/CAG modeling consultant) to obtain the most-current travel demand model so the Contractor can develop the ALPS2000 network as discussed in Task 6. In addition, the Contractor will request and obtain plots and supportive reports detailing Base Year and Year 2025 peak hour (AM and PM) volumes and volume-to-capacity (V/C) ratios.

The basic steps involved in producing travel demand forecasts for up to eight discrete large, long-term alternatives are as follows.

- Based on the definition of alternatives, isolate network attributes (additional roadway connections, inherent capacities (e.g., extended arterial roadways, new fly-over connections, etc.), and number of lanes)
- Develop year 2025 networks for each alternative
- Develop AM and PM peak period traffic forecasts.

### **Evaluation Services by Contractor**

The Contractor shall evaluate the range of alternatives based on measures developed from travel demand modeling outputs. The measures will include the following, as a minimum: screenline volumes; vehicle miles traveled (VMT); vehicle hours of delay (VHD); and V/C ratios. Another technique called “select facility analysis” will also be employed. This technique will help determine who benefits from each alternative. All too often in congested corridors, it can be difficult to measure and rank alternatives because all of them improve some congested links but do not improve all the problems in the area. The select highway facility analysis will help answer the question, “Who is benefiting?” Thus, alternatives that provide benefits to the intended area and stakeholders can be differentiated from those that provide benefits to other areas. The evaluation phase provides, in essence, a screening process that can facilitate the selection of alternatives to move forward. It also obviates the need to conduct fairly labor-intensive operational analyses for each one of the alternatives. The main idea is to select alternatives that demonstrate reasonable performance then conduct traffic operations analyses to ensure they are operationally feasible.

The Contractor will evaluate these forecasts for up to eight discrete large and medium alternatives by conducting the following steps.

- Develop screenline volume comparisons, VMT and VHD comparisons, and V/C ratios on key roadway facilities;
- Develop select highway facility analysis;
- Screen the list of alternatives to eliminate alternatives with minimal benefits;
- If necessary based on result of operations analysis, revise alternatives as appropriate and re-run the forecasts one time;
- Develop supplemental outputs to document revised measures of effectiveness;
- Compare and contrast model outputs in a matrix, and prepare a written discussion to support the findings.

### **Deliverables**

- Memorandum discussing procedures and findings regarding evaluation of travel demand forecasts by alternative: one electronic file in Word for Windows
- An appendix of model plots and outputs: one camera-ready copy.

## **TASK 6 - OPERATIONAL ANALYSIS**

### **ALPS2000 Model Development and Use**

The analysis of the potential improvements uses the ALPS2000 model software to leverage the power of both the regional model and the detailed microscopic traffic simulations. This key middle layer bridges the gap to provide higher fidelity analyses.

An ALPS2000 segment model of the existing study area will be created first. The network will comprise the major roadways in the area. Each endpoint of the network becomes an origin and destination for trips. Traffic counts will be obtained for each origin/destination (O/D) point for use in trip production and calibration.

Drawing from efforts in Task 2 and Task 5, the regional models will be manipulated to extract regional peak hour O/D trip data for the origins and destinations created in the ALPS2000 model. The share from each origin to the various destinations will be calculated for each of the peak hours, and on a daily basis.

Trip generation will be created by factoring traffic counts at each origin by the destination share obtained from the regional model. That is, the origin trips will be distributed to destinations based on the regional travel model. Peak period and daily shares will be applied as appropriate by time of day. Numerical techniques will be used to adjust the trip table to more closely approximate the destination traffic counts. These calculations will create a trip table for each hour of the day.

With a network and trip generation, the ALPS2000 model will be calibrated to match traffic counts collected at major O/D points. This will meet the overall objective of calibration, a reasonable platform for future year modeling.

The calibrated model will then be revised to model future conditions. Committed roadway expansion projects included in the future regional model will be included. The future regional model will also be exercised to extract the future O/D data. Growth rates by O/D pair will be calculated and applied to the calibrated model. This future model, with a future network and future trip data, will form the Future Baseline Model.

Performance metrics will be obtained from the Future Baseline Model. These include such measures as average speed, average delay, travel times on key routes, vehicle miles traveled, duration of congestion, queue propagation, and emissions. This data will provide a means to compare the alternatives developed to mitigate traffic congestion.

Up to eight discrete large and medium alternatives will be modeled using ALPS2000. These will be created by making changes to the network, such as adding new highway links, modifying interchanges, adding ramps, or widening highway sections. The O/D trip data will not be revised but remain constant for each alternative to allow direct comparison between the alternatives. The mesoscopic ALPS2000 model allows a means to model many alternatives rapidly and efficiently. The performance metrics will be obtained for each alternative modeled, and a comparison of the alternatives will be made using the metrics.

### **Microscopic Analysis**

The Contractor shall use SYNCHRO to evaluate future baseline traffic conditions at selected signalized intersections. With respect to analysis of alternatives, critical intersections affected by particular alternatives will be isolated and evaluated by comparing performance measures with those found under

the Future Baseline case. The budget assumes analysis of future conditions at 30 intersections (AM and PM peak hour).

The Contractor shall use a microsimulation tool (VISSIM or CORSIM) to further evaluate future conditions under major alternatives with respect to variations in network attributes (e.g. capacity, speed, and links). To maximize utility and efficiency, networks will be created for the portions of the street and highway system directly affected by the particular alternative under study. Animation will be used as appropriate to visually demonstrate the traffic flow implications of alternatives. The budget assumes creation and evaluation of 6 discrete sub-networks (AM and PM peak hour).

Standard performance measures will be obtained from the microscopic tools and will include the following.

- Level of service (LOS)
- Average control delay per vehicle
- Queues
- Travel time
- Average speed
- Total stops.

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

### **Deliverables**

- Memorandum describing procedures and findings of operational analysis: one copy in Word for Windows format
- An appendix of technical details of the analysis: one camera-ready copy.

## **TASK 7 - ENVIRONMENTAL AND SOCIAL IMPACTS**

Contractor shall prepare a disclosure of overall environmental issues and impacts associated with up to five improvement alternatives. This information will be general in nature, consistent with the large-scale and preliminary nature of this planning study. The study area has been the subject of numerous EIRs and related documents. There are also various environmental databases that cover the project area. The work undertaken during this task will utilize this extensive body of information. Fieldwork will be limited to general “windshield-type” surveys.

Working with the project team, DJP will depict the study area’s primary environmental resources on aerial photographs. This will facilitate the delineation of alternatives in a manner that avoids significant environmental impacts to the extent feasible. Constraints and issues to be disclosed include the following.

- Land Use (residential areas, businesses, parks, Palo Alto Airport, etc.)
- Geology (liquefaction potential, fault zones, etc.)
- Hydrology (floodplains)
- Biology (wetlands, creeks, endangered species, etc.)
- Cultural (archaeological and historical sites)
- Hazardous Materials (sites with substantial contamination)

- Noise (areas where high noise levels would be problematic)
- Visual (areas where scenic views/vistas are important).

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

### **Deliverables**

- Memorandum discussing procedures and findings of environmental review, including a summary matrix comparing impacts of the alternatives: one copy in Word for Windows format.

## **TASK 8 - CONCEPTUAL COST ESTIMATES**

Based on the conceptual studies defined in Task 4, the Contractor shall refine the alternatives for the purpose of preparing conceptual project cost estimates. The Contractor shall prepare conceptual cost estimates that generally follow the Caltrans "Project Study Report (PSR) Estimates" guidelines as set forth in the *Project Development Procedures Manual*. Cost estimates will be broken down according to the following categories.

- Roadway Items
  - Earthwork
  - Structural Section
  - Drainage
  - Specialty Items (walls, sound walls, landscaping/irrigation, erosion/slope control, etc.)
  - Traffic Items (lighting, signals, signing, traffic control systems, traffic management plan)
  - Minor Items (a contingency for minor work)
  - Roadway Mobilization
  - Roadway Additions (supplemental work items and contingency)
- Structure Items
  - Bridges
  - Other Structures
  - Mobilization and Contingencies
  - Railroad Related Costs
- Right of Way
  - Acquisition (including excess lands and damages)
  - Utility Relocation
  - Clearance/Demolition
  - Fees.

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

### **Deliverables**



- Memorandum summarizing cost estimating assumptions and procedures: one electronic file in Word for Windows format
- Conceptual cost estimates: one electronic file in Excel for Windows format.

## **TASK 9 - PRESENTATION OF ALTERNATIVES**

Contractor shall summarize the alternatives in a comparison matrix with respect to the following measures.

- Construction
  - Cost
  - Right-of-way
  - Displacement/Relocation
  - Utilities
  - Non-Standard Features
  - Complexity with respect to traffic management
- Traffic Operations
  - System Performance
    - Average speed
    - Average delay
    - Route travel times
    - Duration of congestion
    - Vehicle hours of delay
    - Vehicle miles traveled
    - Emissions
  - Spot Performance
    - Level of service
    - Average control delay
    - Commute traffic on local residential streets
    - Queues (length, number blocking)
    - Travel time
    - Total stops
- Environmental
  - Land use
  - Geology
  - Hydrology
  - Biology
  - Cultural
  - Hazardous materials
  - Noise
  - Visual
- Other
  - Equity (or environmental justice)
  - Neighborhood comfort/feel
  - Creation of barriers within/between communities
  - Influence on non-vehicular travel.

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

### **Deliverables**

- Memorandum discussing and comparing/contrasting alternatives, including evaluation matrix: one electronic file in Word for Windows format
- Enlarged (poster size) evaluation matrix: one hard copy mounted on foam core board.

## **TASK 10 - PUBLIC OUTREACH**

Contractor shall prepare a PowerPoint presentation to summarize the findings of Tasks 1 through 9 as applicable, using materials previously prepared in said tasks. Contractor shall prepare a handout from the PowerPoint presentation.

Contractor shall attend three public meetings and participate in the presentations to inform attendees of study objectives, procedures and findings. Contractor shall record public comments at the three meetings, and summarize them in a memorandum.

### **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

### **Deliverables**

- PowerPoint presentation: one electronic file
- Handout from PowerPoint presentation -- one camera-ready copy
- Memorandum summarizing public outreach process and comments received: one electronic file in Word for Windows.

## **TASK 11 - DRAFT STUDY REPORT**

Contractor shall prepare an outline of the Draft Study Report, including an executive summary at the beginning and lists of tables, figures, and appendices, for review by the Project Manager. Once the outline is approved, the Contractor shall prepare an Administrative Draft Study Report, for review by the Project Manager, which incorporates previously-published materials as appropriate. This will include an executive summary, main body, and appendices, the latter documenting technical analysis as well as comments received as a part of Task 10 - Public Outreach and Task 12 - Additional Public Outreach.

Following receipt of written comments on the Administrative Draft Study Report, the Contractor shall prepare a Draft Study Report that incorporates previously-published materials as appropriate. This will include an executive summary, main body, and appendices, the latter documenting technical analysis as well as comments received as a part of Task 10 - Public Outreach and Task 12 - Additional Public Outreach.

## **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the deliverables and receive feedback.

## **Deliverables**

- Outline of Draft Study Report: one electronic file in Word for Windows format
- Administrative Draft Study Report: one electronic file in Word for Windows format
- Draft Study Report: one camera-ready copy and one electronic file in Word for Windows format.

## **TASK 12 - ADDITIONAL PUBLIC OUTREACH**

Contractor shall prepare a PowerPoint presentation to summarize the Draft Study Report, using materials from the report. Contractor shall prepare a handout from the PowerPoint presentation.

## **Meetings**

Contractor shall attend one public meeting and participate in the presentation to present the Draft Study Report. Contractor shall record public comments at the meeting, and summarize them in a memorandum.

## **Deliverables**

- PowerPoint presentation: one electronic file
- Handout from PowerPoint presentation -- one camera-ready copy
- Memorandum summarizing additional public outreach process and comments received: one electronic file in Word for Windows.

## **TASK 13 - REVIEW FINDINGS AND NEXT STEPS**

Contractor shall extract, if applicable, lists of short-term, mid-term, and long-term projects from the Draft Study Report. These lists will be submitted to the Project Manager for use as handouts at TAC and PAC meetings.

## **Meetings**

Contractor shall attend one TAC meeting and one PAC meeting to review the results of Task 12, review and discuss the project lists, and provide advice and feedback to the committee members.

## **Deliverables**

- Lists (three) of projects: short-term, mid-term, long-term.

## **TASK 14 - FINAL STUDY REPORT**

Contractor shall prepare a Final Study Report that incorporates comments received on the Draft Study Report. This will include a main body and appendices, the latter documenting technical analysis as well as comments received as a part of Task 10 - Public Outreach and Task 12 - Additional Public Outreach.

Contractor shall attend one public meeting with each of the C/CAG, San Mateo County Transportation Authority, and Valley Transportation Authority Boards to support its work.

### **Deliverables**

- Final Study Report: One camera-ready copy and one electronic file in Word for Windows format.

### **SCHEDULE MILESTONES**

The following schedule milestones are based upon the Contractor's proposal and assume a start date of December 1, 2003.

<b>TASK</b>	<b>DURATION (weeks)</b>	<b>ESTIMATED COMPLETION</b>
1 Detailed Work Program and Schedule	6	1/9/04
REVIEWS	2	1/23/04
2 Public Input	4	2/20/04
REVIEWS	2	3/5/04
3 Data Collection/Current Conditions	10	3/12/04
REVIEWS	2	3/26/04
4 Conceptual Definition and Engineering	12	8/13/04
REVIEWS	2	8/27/04
5 Review Travel Forecasts	6	8/13/04
REVIEWS	2	8/27/04
6 Conduct Operational Analysis	16	9/10/04
REVIEWS	2	9/24/04
7 Assess Environmental/Social Impacts	6	11/5/04
REVIEWS	2	8/27/04
8 Develop Conceptual Cost Estimates	6	8/13/04
REVIEWS	2	8/27/04
9 Presentation of Alternatives	10	12/3/04
REVIEWS	2	12/17/04
10 Public Outreach	4	1/14/05
REVIEWS	2	1/28/05
11 Draft Study Report	6	3/11/05
REVIEWS	2	3/25/05
12 Optional Public Outreach	2	4/8/05
13 Review Findings and Next Steps	4	5/6/05
14 Prepare Final Study Report	4	6/3/05